

SEQUENCE LISTING

<110> Nemerow, Glen R.
Li, Erquanq

<120> BIFUNCTIONAL MOLECULES AND VECTORS COMPLEXED THEREWITH FOR TARGETED GENE DELIVERY

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<141> 2001-07-10

<150> converted to a provisional from 09/613,017)

<151> 2000-07-10

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<223> DNA-1 heavy chain penton base monoclonal antibody

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tca	gga	cct	gag	ctg	gtg	aaa	cct	ggg	gcc	tca	gtg	aag	ata	tcc	tgc	
Ser	Gly	Pro	Glu	Leu	Val	Lys	Pro	Gly	Ala	Ser	Val	Lys	Ile	Ser	Cys	150

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Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr Asn Met His Trp Val Lys
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cag agc cat gga aag agc ctt gag tgg att gga tat att tat cct tac 246
Gln Ser His Gly Lys Ser Leu Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr
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aaa ggt ggt act ggc tac aac cag aag ttc aag agc aag gcc aca ttg 294
Lys Gly Thr Gly Tyr Asn Gln Lys Phe Lys Ser Lys Ala Thr Leu
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aca aca gac agt tcc tcc aac aca gcc tac atg gag ctc cgc agc leu
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Thr Ser Asp Ala Ser Ala Val Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr
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tgg ggc caa ggg act ctg gtc act gtc tct gca gcc aaa acg aca ccc
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 125 130 135 438

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 Pro Ser Val Tyr Pro Leu Ala Pro Gly Ser Ala Ala Gln Thr Asn Ser
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atg gtg acc ctg gga tgc ctg gtc aag ggc tat ttc cct gag cca gtg
 Met Val Thr Leu Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val
 155 160 165 534

aca gtg acc tgg aac tct gga tcc ctg tcc agc ggt gtg cac acc ttc
 Thr Val Thr Trp Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe
 170 175 180 185 582

cca gct gtc ctg cag tct gac ctc tac act ctg agc agc tca gtg act
 Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu Ser Ser Val Thr
 190 195 200 630

gtc ccc tcc agc acc tgg ccc agc gag acc gtc acc tgc aac gtt gcc
 Val Pro Ser Ser Thr Trp Pro Ser Glu Thr Val Thr Cys Asn Val Ala
 205 210 215 678

cac ccg gcc agc agc acc aag gtg gac aag aaa att gtg ccc agg gat
 His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys Ile Val Pro Arg Asp
 220 225 230 726

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 Cys Gly Cys Lys Pro Cys Ile Cys Thr Val Pro Glu Val Ser Ser Val
 235 240 245 765

ttc atc ttc ccc cca aag ccc aag gat gtg ctc acc att act ctg act
 Phe Ile Phe Pro Pro Lys Pro Lys Asp Val Leu Thr Ile Thr Leu Thr
 250 255 260 265 822

cct aag gtc acg tgt gtt gta gac atc agc aag gat gat ccc gag
 Pro Lys Val Thr Cys Val Val Asp Ile Ser Lys Asp Asp Pro Glu
 270 275 280 870

gtc cag ttc acg tgg ttt gta gat gat gtg gag gtg cac aca gct cag
 Val Gln Phe Ser Trp Phe Val Asp Asp Val Glu Val His Thr Ala Gln
 285 290 295 918

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 Thr Gln Pro Arg Glu Glu Phe Asn Ser Thr Phe Arg Ser Val Ser
 300 305 310 966

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 Glu Leu Pro Ile Met His Gln Asp Trp Leu Asn Gly Lys Glu Phe Lys
 315 320 325 1014

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 Cys Arg Val Asn Ser Ala Ala Phe Pro Ala Pro Ile Glu Lys Thr Ile
 330 335 340 345 1062

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 Ser Lys Thr Lys Gly Arg Pro Lys Ala Pro Gln Val Tyr Thr Ile Pro
 350 355 360 1110

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 1158

TOP SECRET//~~REF ID: A65663~~

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Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn																																																																																																																																											
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Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val																																																																																																																																											
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Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu																																																																																																																																											
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Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly																																																																																																																																											
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Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp																																																																																																																																											
180	185	190																																																																																																																																									
190																																																																																																																																											

T00740-2250660

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 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
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 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
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 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
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 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
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 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
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 Trp Val Pro Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala
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 Ser Leu Ala Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala
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 Ser Gln Ser Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln
 50 55 60

51

99

147

195

T00720 422E006600

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gac ttc acc ctc aac atc cat cct gtg gag gag gag gat gct gca acc Asp Phe Thr Leu Asn Ile His Pro Val Glu Glu Asp Ala Ala Thr 95 100 105	339
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 Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro
 50 55 60
 Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser
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 Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 85 90 95
 Leu Asn Ile His Pro Val Glu Glu Asp Ala Ala Thr Tyr Tyr Cys
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 Gln Gln Thr Asn Glu Asp Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu
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 Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly
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 Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser
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 Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp
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tat tac tgt gca aga ggg att gct tac tgg ggc caa ggg act ctg gtc Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val 115 120 125	384
act gtc tct gca gcc aaa acg aca ccc cca tct gtc tat cca ctg gcc Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala 130 135 140	432
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Y00Y00-222E0660

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Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Pro Glu																																																																																																																	
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Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr																																																																																																																	
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395	400																																																																																																																
aag aac act cag ccc atc atg gac aca gat ggc tct tac ttc gtc tac	1248																																																																																																																
Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr																																																																																																																	
405	410	415		agc aag ctc aat gtg cag aag agc aac tgg gag gca gga aat act ttc	1296	Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe		420	425	430		atc tgc tct gtg tta cat	1314	Ile Cys Ser Val Leu His		435		<210> 6		<211> 438		<212> PRT		<213> Mouse		<220>		<221> PEPTIDE		<222> (0)...(0)		<223> Portion of DAV-1 heavy chain used for fusion protein		bifunctional antibody		<400> 6		Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Ser Gly Thr Ala Gly		1 5 10 15		Val His Ser Glu Val Gln Leu Gln Ser Gly Pro Glu Leu Val Lys		20 25 30		Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe		35 40 45		Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu		50 55 60		Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn		65 70 75 80		Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Asn		85 90 95		Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val		100 105 110		Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val		115 120 125		Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala		130 135 140																																									
415																																																																																																																	
agc aag ctc aat gtg cag aag agc aac tgg gag gca gga aat act ttc	1296																																																																																																																
Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe																																																																																																																	
420	425	430		atc tgc tct gtg tta cat	1314	Ile Cys Ser Val Leu His		435		<210> 6		<211> 438		<212> PRT		<213> Mouse		<220>		<221> PEPTIDE		<222> (0)...(0)		<223> Portion of DAV-1 heavy chain used for fusion protein		bifunctional antibody		<400> 6		Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Ser Gly Thr Ala Gly		1 5 10 15		Val His Ser Glu Val Gln Leu Gln Ser Gly Pro Glu Leu Val Lys		20 25 30		Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe		35 40 45		Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu		50 55 60		Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn		65 70 75 80		Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Asn		85 90 95		Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val		100 105 110		Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val		115 120 125		Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala		130 135 140																																																	
430																																																																																																																	
atc tgc tct gtg tta cat	1314																																																																																																																
Ile Cys Ser Val Leu His																																																																																																																	
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bifunctional antibody																																																																																																																	
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Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Ser Gly Thr Ala Gly																																																																																																																	
1 5 10 15																																																																																																																	
Val His Ser Glu Val Gln Leu Gln Ser Gly Pro Glu Leu Val Lys																																																																																																																	
20 25 30																																																																																																																	
Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe																																																																																																																	
35 40 45																																																																																																																	
Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu																																																																																																																	
50 55 60																																																																																																																	
Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn																																																																																																																	
65 70 75 80																																																																																																																	
Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Asn																																																																																																																	
85 90 95																																																																																																																	
Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val																																																																																																																	
100 105 110																																																																																																																	
Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val																																																																																																																	
115 120 125																																																																																																																	
Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala																																																																																																																	
130 135 140																																																																																																																	

Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His
 435

<210> 7
 <211> 157
 <212> PRT
 <213> Human

<220>
 <221> PEPTIDE
 <222> (0)...(0)
 <223> Tumor necrosis factor-alpha (TNF alpha, mature peptide)

<400> 7
 Val Arg Ser Ser Ser Arg Thr Pro Ser Asp Lys Pro Val Ala His Val
 1 5 10 15
 Val Ala Asn Pro Gln Ala Glu Gly Gln Leu Gln Trp Leu Asn Arg Arg
 20 25 30
 Ala Asn Ala Leu Leu Ala Asn Gly Val Glu Leu Arg Asp Asn Gln Leu
 35 40 45
 Val Val Pro Ser Glu Gly Leu Tyr Leu Ile Tyr Ser Gln Val Leu Phe
 50 55 60
 Lys Gly Gln Gly Cys Pro Ser Thr His Val Leu Leu Thr His Thr Ile
 65 70 75 80

<210> 8
<211> 70
<212> PRT
<213> Human

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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Human Insulin-like Growth Factor 1 sequence
      (IGF-1. mature peptide)
```

```

<400> 8
Gly Pro Glu Thr Leu Cys Gly Ala Glu Leu Val Asp Ala Leu Gln Phe
          5           10          15
Val Cys Gly Asp Arg Gly Phe Tyr Phe Asn Lys Pro Thr Gly Tyr Gly
          20           25          30
Ser Ser Ser Arg Arg Ala Pro Gln Thr Gly Ile Val Asp Glu Cys Cys
          35           40          45
Phe Arg Ser Cys Asp Leu Arg Arg Leu Glu Met Tyr Cys Ala Pro Leu
          50           55          60
Lys Pro Ala Lys Ser Ala
          65           70

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<210> 9
<211> 53
<212> PRT
<213> Human

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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Epidermal Growth Factor (EGF, mature peptide)
```

```

<400> 9
Asn Ser Asp Ser Glu Cys Pro Leu Ser His Asp Gly Tyr Cys Leu His
      5          10          15
Asp Gly Val Cys Met Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys Asn
      20          25          30
Cys Val Val Gly Tyr Ile Gly Glu Arg Cys Gln Tyr Arg Asp Leu Lys
      35          40          45
Trp Trp Glu Leu Arg
      50

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<210> 10
<211> 164
<212> PRT
<213> Human

<220>
<221> PEPTIDE
<222> (0) ... (0)

<223> Stem Cell Factor (SCF, mature peptide)

<400> 10
 Glu Gly Ile Cys Arg Asn Arg Val Thr Asn Asn Val Lys Asp Val Thr
 1 5 10 15
 Lys Leu Val Ala Asn Leu Pro Lys Asp Tyr Met Ile Thr Leu Lys Tyr
 20 25 30
 Val Pro Gly Met Asp Val Leu Pro Ser His Cys Trp Ile Ser Glu Met
 35 40 45
 Val Val Gln Leu Ser Asp Ser Leu Thr Asp Leu Leu Asp Lys Phe Ser
 50 55 60
 Asn Ile Ser Glu Gly Leu Ser Asn Tyr Ser Ile Ile Asp Lys Leu Val
 65 70 75 80
 Asn Ile Val Asp Asp Leu Val Glu Cys Val Lys Glu Asn Ser Ser Lys
 95 90 95
 Asp Leu Lys Ser Phe Lys Ser Pro Glu Pro Arg Leu Phe Thr Pro
 100 105 110
 Glu Glu Phe Phe Arg Ile Phe Asn Arg Ser Ile Asp Ala Phe Lys Asp
 115 120 125
 Phe Val Val Ala Ser Glu Thr Ser Asp Cys Val Val Ser Ser Thr Leu
 130 135 140
 Ser Pro Glu Lys Asp Ser Arg Val Ser Val Thr Lys Pro Phe Met Leu
 145 150 155 160
 Pro Pro Val Ala

<210> 11

<211> 597

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and TNF alpha mature peptide

<400> 11
 Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Ser Gly Thr Ala Gly
 1 5 10 15
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Asp Ser Ser Ser Asn
 85 90 95
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
 100 105 110
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
 115 120 125
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
 130 135 140
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205

Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Phe Val Arg Ser Ser Arg Thr Pro
 435 440 445
 Ser Asp Lys Pro Val Ala His Val Val Ala Asn Pro Gln Ala Glu Gly
 450 455 460
 Gln Leu Gln Trp Leu Asn Arg Arg Ala Asn Ala Leu Leu Ala Asn Gly
 465 470 475 480
 Val Glu Leu Arg Asp Asn Gln Leu Val Val Pro Ser Glu Gly Leu Tyr
 485 490 495
 Leu Ile Tyr Ser Gln Val Leu Phe Lys Gly Gln Gly Cys Pro Ser Thr
 500 505 510
 His Val Leu Leu Thr His Thr Ile Ser Arg Ile Ala Val Ser Tyr Gln
 515 520 525
 Thr Lys Val Asn Leu Leu Ser Ala Ile Lys Ser Pro Cys Gln Arg Glu
 530 535 540
 Thr Pro Glu Gly Ala Glu Ala Lys Pro Trp Tyr Glu Pro Ile Tyr Leu
 545 550 555 560
 Gly Gly Val Phe Gln Leu Glu Lys Gly Asp Arg Leu Ser Ala Glu Ile
 565 570 575
 Asn Arg Pro Asp Tyr Leu Asp Phe Ala Glu Ser Gly Gln Val Tyr Phe
 580 585 590
 Gly Ile Ile Ala Leu
 595

<210> 12

<211> 510

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and IGF-1 mature peptide

<400> 12

Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly

1 5 10 15
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Asn
 85 90 95
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
 100 105 110
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
 115 120 125
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
 130 135 140
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Phe Gly Pro Glu Thr Leu Cys Gly Ala
 435 440 445
 Glu Leu Val Asp Ala Leu Gln Phe Val Cys Gly Asp Arg Gly Phe Tyr
 450 455 460
 Phe Asn Lys Pro Thr Gly Tyr Gly Ser Ser Arg Arg Ala Pro Gln
 465 470 475 480
 Thr Gly Ile Val Asp Glu Cys Cys Phe Arg Ser Cys Asp Leu Arg Arg
 485 490 495
 Leu Glu Met Tyr Cys Ala Pro Leu Lys Pro Ala Lys Ser Ala

500

505

<210> 13
<211> 493
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and EGF mature peptide

<400> 13
Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15
Val His Ser Glu Val Gln Leu Gln Ser Gly Pro Glu Leu Val Lys
20 25 30
Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45
Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
50 55 60
Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
65 70 75 80
Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Asn
85 90 95
Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
100 105 110
Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
115 120 125
Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
130 135 140
Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
145 150 155 160
Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
165 170 175
Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
180 185 190
Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
195 200 205
Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
210 215 220
Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
225 230 235 240
Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
245 250 255
Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
260 265 270
Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
275 280 285
Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
290 295 300
Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
305 310 315 320
Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
325 330 335
Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
340 345 350
Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
355 360 365
Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
370 375 380
Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
385 390 395 400

Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Phe Asn Ser Asp Ser Glu Cys Pro Leu
 435 440 445
 Ser His Asp Gly Tyr Cys Leu His Asp Gly Val Cys Met Tyr Ile Glu
 450 455 460
 Ala Leu Asp Lys Tyr Ala Cys Asn Cys Val Val Gly Tyr Ile Gly Glu
 465 470 475 480
 Arg Cys Gln Tyr Arg Asp Leu Lys Trp Trp Glu Leu Arg
 485 490

<210> 14

<211> 613

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and SCF mature peptide

<400> 14
 Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
 1 5 10 15
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn
 85 90 95
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
 100 105 110
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
 115 120 125
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
 130 135 140
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln

305		310		315		320
Asp	Trp	Leu	Asn	Gly	Lys	Glu
				Phe	Lys	Cys
				Arg	Val	Asn
				Ser	Ala	Ala
				325	330	335
Phe	Pro	Ala	Pro	Ile	Glu	Lys
					340	345
						350
Lys	Ala	Pro	Gln	Val	Tyr	Thr
					355	360
						365
Lys	Asp	Lys	Val	Ser	Leu	Thr
					370	375
						380
Asp	Ile	Thr	Val	Glu	Trp	Gln
					385	390
						395
Lys	Asn	Thr	Gln	Pro	Ile	Met
					400	405
						410
Ser	Lys	Leu	Asn	Val	Gln	Lys
					420	425
						430
Ile	Cys	Ser	Val	Leu	His	Glu
					435	440
						445
Pro	Gln	Gly	Ile	Cys	Arg	Asn
					450	455
						460
Thr	Lys	Leu	Val	Ala	Asn	Leu
					465	470
						475
Tyr	Val	Pro	Gly	Met	Asp	Val
					485	490
						495
Met	Val	Val	Gln	Leu	Ser	Asp
					500	505
						510
Ser	Asn	Ile	Ser	Glu	Gly	Leu
					515	520
						525
Val	Asn	Ile	Val	Asp	Asp	Leu
					530	535
						540
Lys	Asp	Leu	Lys	Lys	Ser	Phe
					545	550
						555
Pro	Glu	Glu	Phe	Phe	Arg	Ile
					565	570
						575
Asp	Phe	Val	Val	Ala	Ser	Glu
					580	585
						590
Leu	Ser	Pro	Glu	Lys	Asp	Ser
					595	600
						605
Leu	Pro	Pro	Val	Ala		
					610	

<210> 15

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> PCI

DAV

cctgctct

230-16

<210> 16
<211> 18

<211> 19
<212> DNA

213 A1

220

<223>
<223> PCR

2225) PCR primer for anti-
DAV-1 heavy chain.

<400> 16

19

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cccagggtca tggagttag

<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer for amplification of DAV-1 kappa chain
      CL-A.

<400> 17
aagatggata cagttggtagc                                         20

<210> 18
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer for amplification of DAV-1 kappa chain
      CL-B.

<400> 18
tgtcaagagc ttcaacaggg                                         20

<210> 19
<211> 15
<212> PRT
<213> Adenovirus

<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Peptide spanning integrin binding site on penton base.

<400> 19
Met Asn Asp His Ala Ile Arg Gly Asp Thr Phe Ala Thr Arg Ala
      5                           10                         15

<210> 20
<211> 9
<212> PRT
<213> Adenovirus

<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Epitope on penton base integrin binding site recognized by DAV-1.

<400> 20
Ile Arg Gly Asp Thr Phe Ala Thr Arg
      1                           5

<210> 21
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR sense primer for subcloning DAV-1 heavy chain for whole antibody
      or Fab'2 constructs.

```

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<400> 21
ggtaccggcca ccatgggatg gagctggatc t
 <210> 22
 <211> 24
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for whole antibody construct.

<400> 22
gaattcatgt aacacagagc agga
 <210> 23
 <211> 35
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> PCR sense primer for subcloning DAV-1 light chain for whole antibody or Fab'2 constructs.

<400> 23
aagcttgcca ccatggagac agacacaatc ctgct
 <210> 24
 <211> 28
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> PCR antisense primer for subcloning DAV-1 light chain for whole antibody or Fab'2 constructs.

<400> 24
tcttagatgtc tctaacaatc attcttgt
 <210> 25
 <211> 24
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for Fab'2 constructs.

<400> 25
gaattctgtat acttctggaa ctgt
 <210> 26
 <211> 26
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> PCR sense primer for subcloning TNF α into DAV-1/TNF α fusion construct.

<400> 26
gaattcgtca gatcatcttc tcgaac

31

24

35

28

24

26

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```

<210> 27
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR antisense primer for subcloning TNF $\alpha$  into DAV-1/TNF $\alpha$ 
      fusion construct.

<400> 27
gaattctaca gggcaatgat cccaaa 26

<210> 28
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR sense primer for subcloning IGF-1 into DAV-1/IGF-1
      fusion construct.

<400> 28
gaattcggac cggagacgct ctqcg 26

<210> 29
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR antisense primer for subcloning IGF-1 into DAV-1/IGF-1
      fusion construct.

<400> 29
gaattctaag ctgacttggc aggctt 26

<210> 30
<211> 96
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR sense primer for subcloning EGF into DAV-1/EGF
      fusion construct.

<400> 30
gaattcaata gtgactctga atgtccccctg tcccacatgc ggtactgcct ccatgatgg 60
gtgtcatgt atattgaagc attggacaag tatgca 96

<210> 31
<211> 98
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR antisense primer for subcloning EGF into DAV-1/EGF
      fusion construct.

<400> 31
gaattcttagc gcagttccca ccacttcagg tctcggtact gacatcgctc cccgatgttag 60
ccaaacacac agttgcatgc atacttgtcc aatgcttc 98

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<210> 32
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR sense primer for subcloning SCF into DAV-1/SCF fusion construct.

<400> 32
gcggccgcaa gggatctgca ggaatcg

27

<210> 33
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR antisense primer for subcloning SCF into DAV-1/SCF fusion construct.

<400> 33
tcttagagtgc aacaggggggt aacata

26

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